

FORM-PTO-1390  
(Rev. 12-29-99)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

019219-013

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)

**09/937326**INTERNATIONAL APPLICATION NO.  
PCT/NL00/00228INTERNATIONAL FILING DATE  
06 April 2000PRIORITY DATE CLAIMED  
06 April 1999

TITLE OF INVENTION

HYGIENIC ABSORBENT WITH ODOUR CONTROL

APPLICANT(S) FOR DO/EO/US


Arie Cornelius BESEMER; Anne-Mieke VERWILLIGEN and Jeffrey THORNTON

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and the PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An executed oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11. to 16. below concern other document(s) or information included:**

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: published appln. No. WO 00/59556; PCT forms: IPEA/416; IPEA/408 (Written Opinion) and Response dated April 24, 2001

U.S. APPLICATION NO. (If known, see 37 CFR 1.50) <b>09/937326</b>		INTERNATIONAL APPLICATION NO PCT/NL00/00228		ATTORNEY'S DOCKET NUMBER 019219-013	
17. <input checked="" type="checkbox"/> The following fees are submitted:				<b>CALCULATIONS</b>	PTO USE ONLY
<b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b>  Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$1,000.00 (960)  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$860.00 (970)  International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$710.00 (958)  International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$690.00 (956)  International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$100.00 (962)  <div style="text-align: right;"><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b></div>				\$ 860.00	
Surcharge of \$130.00 (154) for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492(e)). 20 <input type="checkbox"/> 30 <input type="checkbox"/>				\$	
Claims	Number Filed	Number Extra	Rate		
Total Claims	9 -20 =	0	X\$18.00 (966)	\$	
Independent Claims	2 -3 =	0	X\$80.00 (964)	\$	
Multiple dependent claim(s) (if applicable)			+ \$270.00 (968)	\$	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ 860.00	
Reduction for 1/2 for filing by small entity, if applicable (see below).				\$ -	
<b>SUBTOTAL =</b>				\$ 860.00	
Processing fee of \$130.00 (156) for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492(f)). 20 <input type="checkbox"/> 30 <input type="checkbox"/>				\$ +	
<b>TOTAL NATIONAL FEE =</b>				\$860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 (581) per property +				\$ 40.00	
<b>TOTAL FEES ENCLOSED =</b>				\$900.00	
				Amount to be: refunded	\$
				charged	\$
a. <input type="checkbox"/> Small entity status is hereby claimed. b. <input checked="" type="checkbox"/> A check in the amount of \$ <u>900.00</u> to cover the above fees is enclosed. c. <input type="checkbox"/> Please charge my Deposit Account No. <u>02-4800</u> in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. d. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>02-4800</u> . A duplicate copy of this sheet is enclosed.  <b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>					
SEND ALL CORRESPONDENCE TO: Ronald L. Grudziecki BURNS, DOANE, SWECKER & MATHIS, L.L.P. P.O. Box 1404 Alexandria, Virginia 22313-1404 (703) 836-6620			<div style="text-align: center;">               SIGNATURE           </div> <div style="text-align: center;">             William C. Rowland              NAME           </div> <div style="text-align: center;">             30,888              REGISTRATION NUMBER           </div>		

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U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)

**09/937326**INTERNATIONAL APPLICATION NO.  
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06 April 2000PRIORITY DATE CLAIMED  
06 April 1999

## TITLE OF INVENTION

HYGIENIC ABSORBENT WITH ODOUR CONTROL

## APPLICANT(S) FOR DO/EO/US

Arie Cornelius BESEMER; Anne-Mieke VERWILLIGEN and Jeffrey THORNTON

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Claims</th> <th style="width: 20%;">Number Filed</th> <th style="width: 20%;">Number Extra</th> <th style="width: 20%;">Rate</th> <th style="width: 10%;"></th> <th style="width: 15%;"></th> </tr> <tr> <td>Total Claims</td> <td>9 -20 =</td> <td>0</td> <td>X\$18.00 (966)</td> <td>\$</td> <td></td> </tr> <tr> <td>Independent Claims</td> <td>2 -3 =</td> <td>0</td> <td>X\$80.00 (964)</td> <td>\$</td> <td></td> </tr> <tr> <td colspan="3">Multiple dependent claim(s) (if applicable)</td> <td>+ \$270.00 (968)</td> <td>\$</td> <td>-</td> </tr> </table>	Claims	Number Filed	Number Extra	Rate			Total Claims	9 -20 =	0	X\$18.00 (966)	\$		Independent Claims	2 -3 =	0	X\$80.00 (964)	\$		Multiple dependent claim(s) (if applicable)			+ \$270.00 (968)	\$	-		
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b. ☒ A check in the amount of \$ 900.00 to cover the above fees is enclosed.


c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of \$ \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.

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 Ronald L. Grudziecki  
 BURNS, DOANE, SWECKER & MATHIS, L.L.P.  
 P.O. Box 1404  
 Alexandria, Virginia 22313-1404  
 (703) 836-6620

  
 SIGNATURE  
  
 William C. Rowland  
 NAME  
  
30,888  
 REGISTRATION NUMBER

Patent  
Attorney's Docket No. 0199219-013

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of	)	
	)	
SCA Hygiene Products Zeist B.V. et al.	)	Group Art Unit: Unassigned
	)	
Application No.: Unassigned	)	Examiner: Unassigned
	)	
Filed: September 24, 2001	)	
	)	
For: HYGIENIC ABSORBENT WITH	)	
ODOUR CONTROL	)	
	)	
	)	
	)	

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination of the above-captioned application, kindly enter the following amendment.

**IN THE CLAIMS:**

Kindly rewrite claims 4-7 as follows:

4. (Amended) Superabsorbent material according to claim 1, in which said non-acidic compound is present in an amount of 1-20wt. % with respect to the weight of superabsorbent material.
5. (Amended) Superabsorbent material according to claim 1, in which the non-acidic compound is homogeneously divided in the superabsorbent material.

6. (Amended) Superabsorbent material according to claim 1, in which the non-acidic compound is chemically bound to the superabsorbent material.

7. (Amended) Hygiene product such as a diaper, comprising a superabsorbent material comprising a non-acidic compound selected from acid anhydrides, lactides, lactones and hydrolysable esters.

Please add the following new claims 8-9:

8. (New) Hygiene product according to claim 7, in which the non-acidic compound selected from lactides and lactones of  $\gamma$ - or  $\delta$ -carboxylic acids.

9. (New) Hygiene product according to claim 7, in which said non-acidic compound is present in an amount of 1-20 wt. % with respect to the weight of the superabsorbent.

**REMARKS**

The claims have been amended to better conform to U.S. practice. The foregoing amendments are made to the claims submitted in the International Application on April 6, 2000. Accordingly, it is submitted that no new matter has been added.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: William C. Rowland  
William C. Rowland  
Registration No. 30,888

P.O. Box 1404  
Alexandria, Virginia 22313-1404  
(703) 836-6620

Date: September 25, 2001

**Attachment to Preliminary Amendment dated September 25, 2001**

**Marked-up Claims 4-7**

4. (Amended) Superabsorbent material according to [any one of the preceding claims] claim 1, in which said non-acidic compound is present in an amount of 1-20wt. % with respect to the weight of superabsorbent material.

5. (Amended) Superabsorbent material according to [any one of the preceding claims] claim 1, in which the non-acidic compound is homogeneously divided in the superabsorbent material.

6. (Amended) Superabsorbent material according to [any one of the preceding claims] claim 1, in which the non-acidic compound is chemically bound to the superabsorbent material.

7. (Amended) Hygiene product such as a diaper, comprising a superabsorbent material [according to any one of the preceding claims] comprising a non-acidic compound selected from acid anhydrides, lactides, lactones and hydrolysable esters.



Hygienic absorbent with odour control

[0001] The present invention relates to a superabsorbent material for use in hygienic absorbent products such as diapers, sanitary napkins and the like, which has enhanced odour control and prevents bacterial growth and to a method of producing such material.

[0002] Superabsorbent materials of various types are known in the art. Examples are crosslinked polyacrylates and polysaccharides grafted with polyacrylates. A problem related to the use of superabsorbent materials is the odour caused by urine components, which cause superabsorbent materials to become objectionable long before there maximum absorbing capacity has been used. As the malodorous compounds are often alkaline materials such as amines, it has been proposed to improve odour control by adding acids to the superabsorbent material. However, the use of acids has disadvantages in that acids will lead to skin irritation.

[0003] US 4,685,909 discloses disposable diapers and the like containing polymeric acidic pH control agents such as cellulose phosphate and polyacrylic acid.

[0004] It has been found that a superabsorbent material with improved odour control can be produced by incorporating in or combining with the superabsorbent material a non-acidic, alkali-neutralising compound selected from acid anhydrides, lactides, lactones and hydrolysable esters.

[0005] Lactides include cyclic esters of hydroxy acids, especially  $\alpha$ -hydroxy acids such as glycolic acid and lactic acid (2,5-dioxo-1,4-dioxanes). Lactones include cyclic esters of hydroxy acids, especially  $\gamma$ - or  $\delta$ -hydroxy acids such as butyrolactone, valerolactone, gluconolactone, glucuronolactone and corresponding lactones of other sugar acids. Examples of hydrolysable esters are cellulose acetate and starch acetate. The non-acidic compound can be chemically bound to the superabsorbent material in the form of esters such as acetylated cellulose. Anhydrides are also suitable, although they are somewhat less preferred than lactides, lactones and hydrolysable esters, possibly because their susceptibility to hydrolysis is too high. They include anhydrides of carboxylic acids, especially cyclic anhydrides of dicarboxylic or polycarboxylic acids such as succinic, glutaric, maleic, citraconic, phthalic acid.

[0006] The amount of neutralising agent (e.g. lactide and lactone) to be incorporated in or to be combined with the superabsorbent material can be 1-20 % by weight, preferably 3-12 % by weight with respect to the weight of the superabsorbing polymer. The amount

of neutralising agent can also be expressed in molar equivalents. In particular the amount is 0.05-1 mmol, in particular 0.15-0.6 mmol per g of superabsorbing polymer.

[0007] An agent facilitating hydrolysis may be added to the neutralising agent. A suitable example is a hydrolysing enzyme, such as a lipase.

- 5 [0008] The superabsorbent materials according to the invention can be used for absorbing fluids, especially body fluids that may produce alkaline odorous components such as urine. The materials may be incorporated in any absorbent article such as sanitary napkins, incontinence pads and baby diapers. As a model for human urine, so-called synthetic urine (SU) is used to study the effectiveness of the superabsorbent materials. The  
10 composition of SU is given in table 1 below:

[0009]

Table 1

component	g/l	mmol/l
magnesium sulphate	0.42	3.5
potassium chloride	4.50	60
sodium chloride	7.60	130
urea	18.00	300
calcium sulphate dihydrate	0.34	2
potassium dihydrogen phosphate	3.54	26
disodium hydrogen phosphate	0.745	5.3
Triton X-100, 0.1%	1.00	
pH 5.9-6.0		

15

**Example 1: Baby diaper**

- [0010] In a baby diaper containing 13 g of polyacrylic acid as absorbent (Libero Maxi Girl), four different alkali-neutralising substances were placed under a non-woven of the diaper and on top of the pulp. 250 ml of SU was added to the diaper. After the addition,  
20 the pH was measured at six different places on the non-woven using a contact electrode, and the values were averaged. The results are summarised in table 2. It can be seen from the table that despite the high buffering capacity of the diaper (>75% of the polyacrylic

acid being in the sodium salt form), the pH is lowered due to hydrolysis of the acid precursor.

[0011]

**Table 2**

neutralising substance	amount (mg)	amount (mmol)	pH after 1 h	pH after 2 h	pH after 5 h
none	-	-	5.75	5.81	5.92
lactide	577	4.0	5.84	5.80	5.47
$\delta$ -gluconolactone	1430	8.0	5.96	5.85	5.33
maleic anhydride	600	6.1	5.70	n.d.	5.43

**Example 2: Sanitary napkin**

[0012] In a sanitary napkin (Libresse) containing CTMP (chemically treated mechanical pulp) as absorbent, three different alkali-neutralising substances were placed in the middle of the CTMP of the napkin. 15 ml of SU was added to the napkin. After the addition of the urine, the pH was measured at six different places on the non-woven using a contact electrode, and the values were averaged. The results are summarised in the following table 3. The table shows that addition of lactide lowers the pH quickly, whereas the same amount of (maleic) anhydride results in a slower but continuing pH decrease. A direct acid (citric acid) tends to be too acidic.

[0013]

**Table 3**

neutralising substance	amount (mg)	amount (mmol)	pH after 2 h	pH after 5 h
none	-	-	5.76	5.67
lactide	34	0.23	4.51	4.56
maleic anhydride	23	0.23	5.36	4.32
citric acid	49	0.23	3.98	3.80

**Example 3: Baby diaper**

[0014] 250 ml SURM was added to a baby diaper (Libero maxi). Different amounts of glycolide, from 0.2 g to 1.6 g per diaper, were put into diapers, under the non-woven of the diaper and on top of the pulp. Each diaper also contains 1 g of lipolase 100 T (Novo Nordisk). For each measurement the pH of the diaper was measured on the non-woven at six different places with a contact electrode. The averaged results are shown in table 4.

[0015]

**Table 4**

Amount of glycolide added		Starting	pH	pH	pH
g	mmol	pH	After 1 hour	After 2 hours	After 5 hours
0.2	1.7	6.0	5.1	5.0	5.0
0.4	3.4	5.9	5.1	4.9	4.9
0.8	6.9	5.9	4.4	4.9	4.8
1.6	13.8	5.9	4.8	4.6	4.6

### Claims

1. Superabsorbent material comprising a non-acidic compound selected from acid anhydrides, lactides, lactones and hydrolysable esters.
2. Superabsorbent material according to claim 1, in which the non-acidic compound is selected from lactides and lactones of  $\gamma$ - or  $\delta$ -carboxylic acids.
3. Superabsorbent material according to claim 2, in which the non-acidic compound is selected from lactide, glycolide and gluconolactone.
4. Superabsorbent material according to any one of the preceding claims, in which said non-acidic compound is present in an amount of 1-20 wt.% with respect to the weight of the superabsorbent material.
5. Superabsorbent material according to any one of the preceding claims, in which the non-acidic compound is homogeneously divided in the superabsorbent material.
6. Superabsorbent material according to any one of the preceding claims, in which the non-acidic compound is chemically bound to the superabsorbent material.
7. Hygiene product such as a diaper, comprising a superabsorbent material according to any one the preceding claims.

# COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL DESIGN, NATIONAL STAGE OF PCT OR CIP APPLICATION)

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

## Hygienic absorbent with odour control

the specification of which: (complete (a), (b) or (c) for type of application)

### REGULAR OR DESIGN APPLICATION

a. ☐ is attached hereto.  
b. ☐ was filed on \_\_\_\_\_ as Application  
Serial No. \_\_\_\_\_ and was amended on \_\_\_\_\_  
(if applicable)

### PCT FILED APPLICATION ENTERING NATIONAL STAGE

c. ☒ was described and claimed in International application No. PCT/NL00/00228  
filed on 6 April 2000  
and as amended on \_\_\_\_\_ (if any)

### ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, paragraph 1.56(a).

In compliance with this duty there is attached an information  
disclosure statement 37 CFR 1.97

### PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code paragraph 119 of any foreign application (s) for patent of inventor's certificate listed below and have also identified below any foreign application for patent of inventor's certificate having a filing date before that of the application on which priority is claimed.

(complete (d) or (e))

- d. ☐ no such applications have been filed  
e. ☒ such applications have been filed as follows

**EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION**

Country	Application Number	Date of filing (day, month, year)	Date of Issue (day, month, year)	Priority claimed
Europe	99201087.6	6 April 1999		Yes

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION**

**CONTINUATION-IN-PART**

(Complete this part only if this is a continuation-in-part application)

I hereby declare claim the benefit under Title 35, United States code, paragraph 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claim of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, paragraph 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, paragraph 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing date) (Status) (patented, pending, abandoned)

(Application Serial No.) (Filing date) (Status) (patented, pending, abandoned)

**POWER OF ATTORNEY**

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and trademark office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

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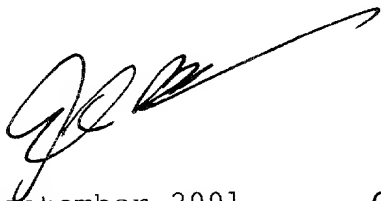
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

100 Full name of first inventor: BESEMER, Arie Cornelis

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Date 4 September 2001

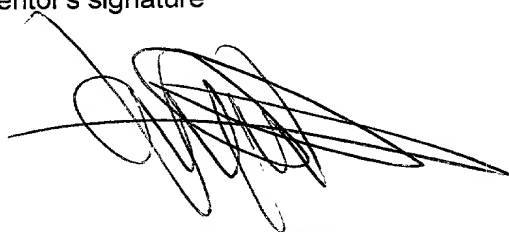
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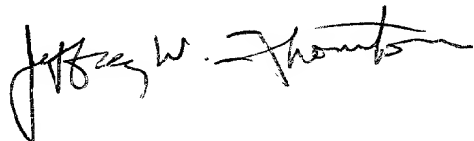
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